



Understanding Your Lab Results

You have just received results from the water samples that the EPA took from your home well. Unless you are a scientist yourself, you probably have some questions about the numbers, abbreviations, and terms used on this report.

At the top of the results, there are codes that are used to identify the particular sample, so researchers can look up where exactly the sample was taken. The name of the laboratory doing the testing might also appear on the page, as well as the time and date the sample was collected from your well. Here are some answers to frequently asked questions about your laboratory results. For more clarification, please call your EPA contact.

What is the matrix?

The matrix is the type of sample taken, such as soil, water, or air. For example, since your residential well was sampled, your matrix entry should read, "water."

What are the units?

Units are the measurement used. For example, your height is measured with the units of feet and inches. For water samples, you may see the unit symbol $\mu\text{g/L}$ or ppb. Micrograms per liter, abbreviated $\mu\text{g/L}$, is a measure of the mass of the substance per liter of water. This measurement is more commonly known as parts per billion, or ppb. One part per billion equals 1 part in 1,000,000,000 parts. An analogy for one part per billion is looking for one drop of chlorine in an Olympic-sized swimming pool.

What is a dilution factor?

The dilution factor is the amount a sample may be diluted (watered down) in order to obtain accurate analytical results. Dilution is usually required if there are high levels of chemicals in samples. A dilution factor of 1 indicates that the sample was not diluted, or water was not added to the sample.

What is an analyte?

The word analyte is a general term for a substance in the sample. The lab does testing to find specific analytes, or substances, in the water sample. For instance, the lab may be looking for metals such as lead, cadmium, or arsenic. The lab report calls these substances analytes. The report should list each analyte the lab was testing for and what amounts they found.

What is the MCL?

The Maximum Contaminant Level (MCL) is the amount of the analyte that can be present in the water sample that the government considers acceptable to drink. For samples from residential wells, the EPA sets these limits based on the Safe Drinking Water Act, passed by Congress in 1974.

What are all these letters? (Sometimes appearing in a column called “flags” or “DVQ”)

When EPA receives the test results from the laboratory, EPA performs a quality check on the lab results. After this quality check, EPA may mark the measurement of certain analytes (the substance in the water) with a flag or qualifier to give readers additional information about the measurement. This information can apply to 1) how certain EPA is that the lab detected the analyte and 2) how certain EPA is of the measurement of the analyte once detected. If there is no “flag” by the result, the detection and measurement of the analyte are certain. Here are explanations for possible “flags”:

1) Flags related to whether or not an analyte was detected:

U – Not detected. If there is a number next to the U, this number is the amount of analyte that would have to be present to be detected by the lab.

B – To ensure that the laboratory is not adding contamination of its own to the results, the lab always tests a plain water sample with the real samples. If you see a ‘B’ next to a result, this means that the analyte was present at low levels in the sample of plain water. The lab is uncertain if the amount of analyte found is from your well or from the water and equipment used in the lab.

R – Unreliable result. A re-test is needed for an accurate measurement.

2) Flags related to the certainty of the measurement of the analyte:

J - This means that the analyte was detected, but the value of the result is an estimate. This can happen for several reasons. One example is when the analyte the lab is testing for is detected, but at such a low level that the testing equipment cannot measure the exact amount.

L – This means that the analyte was detected, but the lab report may show an amount lower than what is actually there. The real result may be higher.

UJ or UL – The U before the J or L means that the analyte was not detected in the sample, but this result may be inaccurate. Some analyte might be present.

K – This means that the analyte was detected, but the level is probably lower.

Q – No result was obtained.

Here are some other acronyms you might see:

RAL stands for the ‘Removal Action Level.’ This level is an amount of the substance (usually in parts per billion) needed to authorize a removal action, or emergency cleanup, for EPA. Levels of analyte below this number do not require a removal action.

SQL stands for the ‘sample quantitation limit.’ This limit is the smallest level of the substance the equipment used by the laboratory can detect. If the analyte is present at a lower level, this laboratory will not be able to find it.